Marlene H Dorch Secretary
Federal Communications Commission
236 Massachusetts Ave NE
Washington, DC 20002

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July 13, 2005

Re: MM Docket no. 99-325

Dear Ms. Dortch

Enclosed you will find the original and 4 copies of 9 pages of my comments to MM Docket 99-325. Please enter these my comments into the proceedings.

Sincerely Yours,

George M. Frese

George M. Frese, P.E.
Professional Broadcast Engineer

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COMMENTS BY GEORGE M. FRESE, P.E.
RADIO BROADCAST CONSULTING ENGINEER

Comments called for by the Federal Communications Commission
Regard Setting Standards for a Digital IBOC Broadcast System
MM Docket No. 99-325

Qualifications of the writer:

My name is George M. Frese. For my first paragraph I will present a brief time line of my life's work as a broadcast engineer.

Fifty Years: In 1955 I received my Professional Engineer License for Electrical Engineering from the State of Washington. I immediately began a one-owner full time Radio and Television Broadcasting Consulting Engineering Practice, and have practiced continually since that time, with no plans to retire. During this 50 year period I have consulted with AM, FM, and TV broadcast stations numbering something well over 1000; in that time the ratio would be roughly 60% AM, 30% FM, and 10% TV. I am a long time standing member of IEEE, AFCCE, and SBE.

During this 50 year period I designed, built and installed specialized items as needed. A list of some of these items is presented in the Addendum on page 4.

AM Radio Today

AM radio is playing an important role in radio broadcasting, especially in the Pacific Northwest, as I know it. FM plays yet another role, and the two roles are hardly the same.

Comments Being Called For: Comments are now being called for to write standards to hybrid the present AM system with a digital IBOC system (In Band On

Channel), using primarily Ibiquity digital technology. The primary system would be digital, but with emergency back up to AM when the digital was not functioning due to a weak signal, noise, or phase distortion. Also the AM (now degraded) would be available to listeners who had not yet purchased a digital receiver. Obviously this is not a hybrid system that has respect for the present analog AM technology. The present analog system stands mostly in the way of this digital system, so that it would be better for this digital system if the present AM analog system were not there.

A Closer Look at AM: Let's take a closer look at the present AM system. It is said that AM radio (Amplitude Modulation) does not have the wideband audio that a digital system will have. That is true, but it is not for the reason that it is amplitude .modulation. Amplitude modulation will equal the audio quality of FM and up until recently, most transmitters did that. Between 1950 to after 1980, radio stations were required to run an annual overall audio proof of performance. During that time period, I ran more than 500 audio proofs on broadcast transmitters, and most of them had excellent frequency response ±3 dB to 10 kHz, and many transmitters to 15 kHz. Quite often I would connect the output of my proof demodulator to a flat hi-fi amplifier speaker system and play their music, comparing the output of the studio console to the output of the transmitter. When a good proof job was finished, there was no difference in the quality that could be detected with the ear. AM stereo could have been the same way, but that's a different story that most engineers already know about.

Setting Radio Broadcast Standards: The market place can be a very good method for setting standards, but it has some serious drawbacks, in that some standards have to be set before the market place can function at all, and it requires a long period of

time. It may work for receiver manufacturers, but it is less effective for transmitter manufactures.. New Standards should never be set too quickly. When new standards appear to be needed, the standards need first to consider the needs of the final listener, then the needs of the broadcaster, and last and the needs of the company doing the design. As I read it in the trade magazines, we have this backwards. Engineers are to consider the company first, the broadcaster second, and the listener third.

Narrow banding of AM was a long time market place decision: In the early days, the best audio quality was known as broadcast quality. But radio manufacturers soon learned that narrow band radios greatly outsold wide band radios, and so they started to develop sharper IF transformers. What the listener wanted was better selection of stations as apposed to quality to 15 kHz. Therefore the receiver manufacturers sharpened up the IF amplifiers. Tone controls became treble controls. The basic reason for this entire happening was the original standard of the 10 kHz separation between channel assignments. This has proven to be a good standard to get the maximum number of stations within the available band. This required that the second, third, and even the fourth and fifth adjacent channels had to be given special consideration, both as to the interference standards and later to the NRSC-2 mask. For good reason, the AM quality we now have is what the market place (the listener) wants out of a 10 kHz band system. Any system that fills up the NRSC-2 mask to the top and extends what it calls IBOC service to 30 kHz in the place of the present AM 20 kHz service is going to produce objectionable interference to radio services the listeners now have.

Personal Experience with Digital Radio: Just recently the first Ibiquity system in the Pacific Northwest came on the air at KEX 1190 kHz, 50 KW in Portland.

Since then I have not been to Portland, but my Professional Consulting Engineer friend Bob McClanathan recently drove from Portland to Salem, listening to KEX. He was able to observe adjacent channel hiss to Salem, including some background noise to KCCS on 1220 kHz approaching Portland.

Kahn's POWER-side: Recently I did get a chance to listen to a Kahn's POWER-side system. While driving west from Ritzville past Moses Lake, and scanning the radio, it stopped on 1400 kHz, Class C, 1 KW, KRSC Othello. I was amazed at the sound, and so I investigated further, and determined that it was the most impressive AM signal on the dial. KRSC certainly did not have the strongest field strength. My traveling companion Dewey Trostel told me that they were operating with a KAHN POWER-side. I was impressed, and convinced that I would have been even more impressed if I could have tuned the receiver off one or two kHz into the middle of the information band. Leonard Kahn tells us that his Cam-D will outperform the POWER-side. I have much confidence in what Kahn says is the truth.

NRSC-2: In 1994 the Federal Communications Commission issued new rules requiring that all AM broadcast stations make annual emission proof of performance measurements in compliance with the NRSC-2 mask and including all intermodulation, harmonic and extraneous emissions. Since that order, I have made measurements on more than 100 stations, and I often equated the measurements to the real world results on a radio receiver. The first adjacent channel cannot be improved, except by undesirable 5 kHz audio filtering. As NRSC-2 was put into place, 10.2 kHz filters were installed in the audio feed to the transmitter, some modulation levels were cut back, and new solid-state transmitters were becoming more common. The results were more space between

the garbage noise and the mask's upper limits. In the real world, beyond the second adjacent channel, the channels were becoming cleaner. To now fill the mask up with material that is garbage to the analog signal, will go a long way toward further degrading the AM radio service in the Pacific Northwest. That's with NRSC-2. NRSC-5 is a pretty complex technical document, and I do not know what further implications it will pose to the broadcaster.

Wenatchee, Washington: Wenatchee is located approximately midway between Seattle and Spokane, about 140 miles to each city. The next closest cities are much further away; Calgary, Boise, Salt Lake City, Sacramento, Portland, and Vancouver/Victoria. In this Pacific Northwest area, AM radio serves as the main source for local news, including most emergency reporting, talk radio, and Christian radio. Car and truck travel is heavy with a good many people listening to AM radio as they travel, as well as people in the rural areas and small towns. Good service is common to the 0.5 mV/m service contour, and is useable in many cases to below the 0.1 mV/m contour. Any system that eliminates this service will be a great loss for these people. Commissioner Powell has said these people do not need AM service anymore, because they now have satellite service. Satellite service does not and can not replace the service supplied by local AM radio. I have read in the trade journals that the Ibiquity digital system does a good job down to at least 2 mV/m. If that is so, the system will be a disaster for AM radio reception the Pacific Northwest.

Nighttime Secondary Skywave service in the Pacific Northwest:

Four nighttime secondary skywave services are available in Eastern Washington. Cars

and truckers traveling across the state can and do tune into them for continuous one station reception for many miles of travel during the night. My wife listens to KFBK Sacramento many nights before falling asleep. I have made many broadcast common point AM antenna measurements. I have been told that for IBOC Ibiquity, these measurements should be better than a VSWR of 1.2 at 10 kHz, and 1.4 at 15 kHz, carrier to the outer frequency. For directional antennas, multiplexed antennas, and short antenna this requirement seldom can be met, and an antenna redesign, or external lump circuit correction, usually is very complicated and costly when it can be done. With that said, skywave reception, with its continual amplitude and phase changes versus the frequencies across the band, certainly will not work well.

Changes and New Standards: Change for the sake of change has no merit. Standards need to be set from time to time, so as to define the direction and limits that technology can go. I have lived with all the Broadcast Standards and standard changes, since the Federal Radio Commission was changed to the Federal Communications Commission. There are some very fine standards that have made radio broadcasting what it is today. But along the way there has been some poor standards written that has hampered the healthy development of radio broadcasting. The AM stereo standards are a good example of that. The proposed standards that seem to be appearing on the horizon now appear to have the potential to take away rural, small town, and traveler radio services. I believe this is all very unnecessary, for it is not that difficult to identify bad standard proposals in advance. I believe there is a possibility for doing this hybrid thing right. KAHN's Cam-D may do just that. Also in the IEEE Transactions on Broadcasting there are articles that propose other technologies that may do the Digital / analog job right. I suggest that the present standard setting procedures be postponed until all

available AM technologies are studied. What's the hurry? Chances are that if the standards were later, they would be entirely different than if they were written today. Once in place, they will be there for a long long time, good or bad.

Straight Talk: Any standard or system that will trade off for the present AM rural, small town, car traveler service, in exchange for a lesser service area but with higher fidelity with a scanning digital screen, that tells the driver what song is being played, just isn't a fair change for many listeners in the Pacific Northwest. More than that, the exchange will require every listener in America to purchase a new radio including car radios. In addition, it will require that every broadcaster put out a large expenditure for transmitters, antennas, and fees. Some of the smaller broadcasters, that are supplying local news, emergency reports, local talk, home town music, and Christian programming, will either have to go dark, or sell out to a big company. It is almost certain that the new outside owner will not provide much local service programming.

It seems to me that there is a lot at stake on this one, and that the best action that can be taken at this time is to postpone further action until all of the proposed standards can be properly investigated and evaluated.

ADDENDUM From Page 1 "Fifty Years"

List of some of the specialized items designed, built, and installed as needed:

(1) A 5000-watt channel 12 TV transmitter for KVOS-TV Bellingham, installed on Mount Constitution for 7 years, before they purchased a GE 25,000 transmitter. (2) An audio processing device called the Audio Pilot, using new control features such as

asymmetrical wave switching, float clipping, and others. Forty Audio Pilots were made and sold for $2,500 each; (3) The Frese UHF Parapanel antenna was a new design and 30 were constructed and installed with different directional patterns, five years before the first Parapanel antenna was available commercially; (4) I have made out numerous FCC applications for directional antenna systems, including multiplexed systems; (5) In 1990 I modified and installed Homer Ray's original short antenna design of his Paran antenna for radio station KAPS 660 kHz, 10,000 watts in Mount Vernon, Washington. This antenna is only 120 feet high, uses 300 square feet of ground system, with an efficiency of better than the required 282 mV/m at 1 km. This antenna has been licensed and in operation for the past 15 years. (6) KAPS has more recently purchased KBRC 1430 kHz 5 KW, also in Mount Vernon and I am presently working on the design and application to diplex a short 660 kHz antenna onto the 1430 kHz directional antenna system; (7) Presently I am working on a personal computer program to broadband an inherently narrowband AM broadcast antenna or system using external L/C parts.

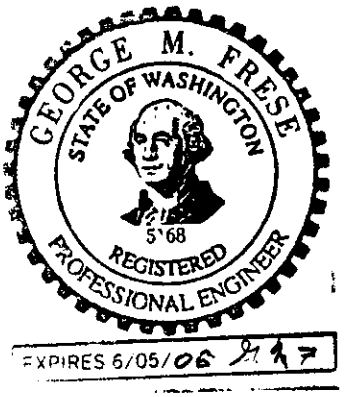
Back Sixty Years: Going back to 1942; my first broadcast job was that of Chief Engineer of 5000 watt KWSC Pullman. In May of 1944 I graduated WSU with a BS Degree in Electrical Engineering, and was immediately drafted into the United States Army Signal Corps. The longest period in my life, when I was not doing radio broadcast engineering work, was six weeks in Basic Training and four months in Officer Candidate School. I was commissioned a Second Lieutenant and was sent to Berlin to serve in two capacities: 1) Communications officer in charge of all radio and long lines communications in and out of Berlin, 2) In charge of the design and construction of the AFN Armed Forces Network broadcast station in Berlin. Immediately following my military service I got my first Chief Engineer's job back, at KWSC. Before this decade was over, I had worked for two more AM radio Stations, and Two more Television

Stations, all of them in their construction stage.

Back 70 Years: Going back now another decade to 1934, I got my first amateur radio call sign W7FMI. Other call signs I had were D4AJD and my present call sign AA7H. Some engineers will recognize the important role that amateur radio can play in the life of a radio engineer.

Beginning 1925: I could go back to 1925 to the building of crystal sets, battery tube radios and phono amplifiers, but it is best to stop here.

Respectfully Submitted



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